

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Applicant : Spall, et al. Art Unit : 1743  
Serial No. : 10/628,072 Examiner : Keri A. Moss  
Filed : July 25, 2003 Conf. No. : 3044  
Title : COMBINATION MARKER FOR LIQUIDS AND METHOD IDENTIFICATION THEREOF

**Mail Stop Appeal Brief - Patents**  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

**BRIEF ON APPEAL**

I. **REAL PARTY IN INTEREST**

The real party-in-interest is Authentix, Inc., who is the assignee of the entire right and interest in the present Application.

II. **RELATED APPEALS AND INTERFERENCES**

There are no appeals or interferences known to Appellants, the Appellants' legal representative, or assignee that will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

III. **STATUS OF CLAIMS**

Claims 12-19, 21-25, 51-57, and 59-61 are pending in the Application.

Claims 1-11, 20, 26-50, 58, and 62-68 have been cancelled without prejudice.

Claims 12-19, 21-25, 51-56, and 58-61 stand rejected. *[Note: Examiner has apparently rejected previously cancelled claim 58 and has remained silent regarding pending claim 57.]*

Claims 12-19, 21-25, 51-57, and 59-61 are being appealed.

IV. **STATUS OF AMENDMENTS**

There were no amendments to the claims or Specification filed after the Final Rejection.

V. **SUMMARY OF CLAIMED SUBJECT MATTER**

Independent Claim 12 recites a method for marking a hydrocarbon liquid comprising the

steps of: (1) adding a first marker to the hydrocarbon liquid having a molar absorptivity of approximately 5 times  $10^4$  L mole $^{-1}$  cm $^{-1}$  or greater in the wavelength range of about 600-1000 nm (p. 8, ll. 6-8); and (2) adding to the hydrocarbon liquid a second marker wherein the second marker is a molecular marker (p. 5, ll. 2-5), and wherein a molecular weight of the second marker is artificially enhanced with a non-radioactive isotope (p. 13, ll. 16-21).

Independent Claim 23 recites a method for marking a hydrocarbon liquid comprising the steps of: (1) adding a first marker to the hydrocarbon liquid having a molar absorptivity of approximately 5 times  $10^4$  L mole $^{-1}$  cm $^{-1}$  or greater in the wavelength range of about 600-1000 (p. 8, ll. 6-8); and (2) adding a second marker to the hydrocarbon liquid (p. 5, ll. 2-5). The first marker contains a compound selected from the group consisting essentially of metal containing and metal free phthalocyanine, metal containing and metal free naphthalocyanine, squarilium, croconic acid, indole and substituted indole cyanine and carbocyanine, thiazole type cyanine and carbocyanine, oxazole type cyanine and carbocyanine, metal dithiolene complexes, and indoaniline metal complexes (p. 8, ll. 12-17). The second marker is selected from the group consisting essentially of 1,2-diphenylbenzene, 1,4-diphenylbenzene, triphenylmethane, 1,3,5-triphenylbenzene, 1,1,2-triphenylethylene, tetraphenylethylene, 1,2,3,4-tetrahydrocarbazole, 1,3-diphenylacetone, 2-chlorobenzophenone, 4,4'-dichlorobenzophenone; 4-benzoylphenone; 4-bromobenzophenone, 4-methoxybenzophenone, 4-methylbenzophenone, 9-fluorenone, 1-phenylnaphthalene, 3,3'dimethoxybiphenyl, and 9-phenylanthracene (p. 12, l. 19 – p. 13, l. 2).

Independent Claim 51 recites a liquid marker compound comprising: (1) a first marker having a molar absorptivity of approximately  $5 \times 10^4$  L mole $^{-1}$  cm $^{-1}$  or greater in the wavelength range of about 600 to 1000 nm (p. 8, ll. 6-8); and (2) a second marker wherein the second marker is a molecular marker (p. 5, ll. 2-5). A molecular weight of the second marker is artificially enhanced with a non-radioactive isotope (p. 13, ll. 16-21).

Independent Claim 61 recites liquid marker compound comprising: (1) a first marker having a molar absorptivity of approximately  $5 \times 10^4$  L mole $^{-1}$  cm $^{-1}$  or greater in the wavelength range of about 600 to 1000 nm (p. 8, ll. 6-8); and (2) a second marker (p. 5, ll. 2-5). The presence of the first molecular marker can be determined by a handheld IR spectrometer (p. 17, ll. 1-3). The second marker is a molecular marker (p. 8, ll. 3-4). A molecular weight of the second marker is artificially enhanced with a non-radioactive isotope (p. 13, ll. 16-21).

**VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL**

A. Claims 12-18, 21-22, 51-56, and 58-61 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,525,516 to Krutak *et al.* ("Krutak") or U.S. Patent No. 6,312,958 to Meyer *et al.* ("Meyer") in view of U.S. Patent No. 5,474,937 to Anderson II *et al.* ("Anderson '937").

B. Claims 19 and 57 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Meyer or Krutak in view of Anderson '937, as applied to claims 12-18, 21-22, 51-56, and 58-61, and further in view of U.S. Patent No. 5,981,283 to Anderson II *et al.* ("Anderson '283").

C. Claims 23-25 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Krutak or Meyer in view of Anderson '283.

**VII. ARGUMENT**

A. Claims 12-18, 21-22, 51-56, and 58 [sic]-61 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Krutak or Meyer in view of Anderson '937.

In the Final Office Action mailed August 10, 2007 (the "Final Office Action"), the Examiner states that it would have been obvious to combine two methods – infrared spectroscopy and mass spectrometry – to complimentarily enhance insufficient sensitivity of one method by the second method. Final Office Action, at 4. Applicants respectfully traverse.

Regarding Meyer, Examiner states: "concentration of 1-2000 ppm is desirable (column 15 lines 29-34)." Final Office Action, at 3. Examiner has incorrectly reported this sensitivity. In fact, Meyer states: "The (weight-based) total amount of markers in the marked liquid is usually within the range from about *0.1 to 5000 ppb*, preferably within the range from 1 to 2000 ppb, particularly preferably within the range from 1 to 1000 ppb." Meyer, col. 15, ll. 31-34.

Examiner has also incorrectly reported the sensitivity of Krutak. Examiner states: "The concentration of 1 ppm is desirable (column 3 lines 30-31)." Final Office Action, at 3. In fact, Krutak describes "detectable emission levels when added to petroleum hydrocarbons at extremely low levels, e.g., *1 ppm or less.*" Krutak, col 3, ll. 30-31.

Thus *Meyer* and *Krutak* are in general agreement as to the sensitivity of absorption markers, and the sensitivity taught by *Meyer* is substantially the same as the sensitivity of less than 1 ppb for certain isotopic compounds and about 1-5 ppb for others taught by *Anderson* '937. Final Office Action, at 4.

Examiner stated: "it would have been obvious for one of ordinary skill in the art to additionally label the second molecular marker disclosed by Krutak or Meyer with a cheap non-radioactive label, such as deuterium disclosed by Anderson, in order to increase the reliability of the results for detecting the labels, since the markers can be detected with two methods – infrared spectroscopy and mass spectrometry, and therefore insufficient sensitivity of one method can be complimentarily enhanced by the second method." Final Office Action, at 4.

Based on the substantially equivalent sensitivities taught by the cited art, there is no motivation to combine the references to complimentarily enhance the insufficient sensitivity of one method by the second method, as suggested by the Examiner.

In its recent opinion in *KSR Int'l Co. v. Teleflex, Inc.*, 127 S.Ct. 1727 (2007), the Supreme Court reaffirmed the *Graham* factors in the determination of obviousness under § 103. *KSR Int'l*, 127 S.Ct. at 1734. The four factual inquiries under *Graham* are:

- (a) determining the scope and content of the prior art;
- (b) ascertaining the differences between the prior art and the claims in issue;
- (c) resolving the level of ordinary skill in the pertinent art; and
- (d) evaluating evidence of secondary consideration.

*Id.* (quoting *Graham v. John Deere*, 383 U.S. 1, 17-18, 148 U.S.P.Q. 459, 467 (1966)).

The Supreme Court further noted the obviousness analysis under § 103 should be explicit, and that it was "important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the [prior art] elements" in the manner claimed. The Court expressly held:

Often, it will be necessary . . . to look to interrelated teachings of multiple patents; the effects of demands known to the design community or present in the marketplace; and the background knowledge possessed by a person having ordinary skill in the art, all in order to determine whether there was an *apparent reason* to combine the known elements in the fashion claimed by the patent at issue. To facilitate review, this analysis *should be made explicit*.

*KSR Int'l*, 127 S.Ct. at 1240-41 (emphasis added). Accordingly, when rejecting a claim based upon a combination of prior art references, it remains necessary to identify the reason why a person of ordinary skill in the art of the patent would have combined the prior art elements in the manner claimed.

Examiner's stated reason why a person of ordinary skill in the art would have combined the cited art is without basis. In addition, there would have been no expectation of an advantage in the way of sensitivity to be gained by combining the cited art. Thus, a *prima facie* case of obviousness has not been established, and Claims 12-18, 21-22, 51-56, and 58-61 are patentable over *Meyer* or *Krutak* in view of *Anderson* '937.

Additionally, Examiner was silent as to why certain of the above claims were rejected. For example:

Claim 14: Examiner failed to provide explicit reasoning regarding the rejection of Claim 14. Regarding *Krutak*, Examiner stated: "[t]he concentration of 1 ppm is desirable...." Final Office Action, at 3. Regarding *Meyer*, Examiner stated: "[t]he concentration of 1-2000 ppm is desirable...." *Id.* Claim 14 recites in part: "wherein the desired concentration of the first marker is between 1 ppb and 10 ppb."

Claims 17 and 55: Examiner failed to provide explicit reasoning regarding the rejection of Claims 17 and 55. The combination of the cited art does not teach or suggest a second marker, wherein the second marker is a polynuclear aromatic hydrocarbon that has been artificially enhanced with a non-radioactive isotope

B. Claims 19 and 57 stand rejected under 35 U.S.C. § 103(a) over *Krutak* or *Meyer* in view of *Anderson* '937 and further in view of *Anderson* '283

Examiner states: "[i]t would have been obvious for any person of ordinary skill in the art at the time the invention was made to substitute the second taggant disclosed by *Meyer* or *Krutak* with the one disclosed by *Anderson* '283, because the aromatic compounds used as taggants by *Anderson* '283 are demonstrated as being very sensitive and compatible with the fuel...." Final Office Action, at 5. Applicants respectfully traverse.

*Meyer* states: "[t]he present invention relates to a method of marking liquids using at least two markers, wherein said markers absorb in the 600-1200 nm region of the spectrum and reemit

fluorescent light and the absorption range of at least one marker overlaps with the absorption range of at least one other marker.” *Meyer*, Abstract.

*Krutak* states: “[i]t is also within the scope of the invention to mark one or more petroleum hydrocarbons with two or more fluorophores, said fluorescing compounds having been selected so that they absorb infrared and/or reemit fluorescent light at wavelengths different enough from each other as not to interfere with individual detection.” *Krutak*, col. 3, ll. 35-40.

Thus, the second markers of *Meyer* and *Krutak* must satisfy specific requirements regarding absorption and emission wavelengths. In contrast, *Anderson* '283 describes chromatographic analysis of tagging agents. *Anderson* '283, Abstract. There is no indication that the tagging agents of *Anderson* '283 would satisfy the absorption/emission requirements of *Meyer* or *Krutak*, nor does the Examiner address this. Examiner appears to have used hindsight reasoning in this combination of the cited art.

The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. *In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990). See M.P.E.P. § 2143.01.III. (emphasis in original). A fundamental reason the patent laws require examiners to show motivation to combine the references that create the case of obviousness and to show that there is a reasonable expectation of success taught or suggested by these references is to prevent the use of hindsight reasoning. *In re Rouffet*, 149 F.3d 1350, 1357, 47 U.S.P.Q.2d 1453 (Fed. Cir. 1998).

It is well settled that the claims cannot be used in hindsight as a template to reconstruct the invention willy-nilly by picking and choosing elements at will from prior art. *Procter & Gamble Co. v. Paragon Trade Brands, Inc.*, 989 F. Supp. 547, 587 (D. Del. 1997); *In re Gorman*, 933 F.2d 982, 987, 18 U.S.P.Q.2d 1885 (Fed. Cir. 1991).

Furthermore, if the proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. *In re Gordon*, 733 F.2d 900, 221, U.S.P.Q. 1125 (Fed. Cir. 1984).

For these reasons, in addition to the reasons discussed in Section VII.A above, Claims 19 and 57 are patentable over *Meyer* or *Krutak* in view of *Anderson* '937 and further in view of *Anderson* '283.

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C. Claims 23-25 stand rejected under 35 U.S.C. § 103(a) over *Krutak* or *Meyer* in view of *Anderson* '283

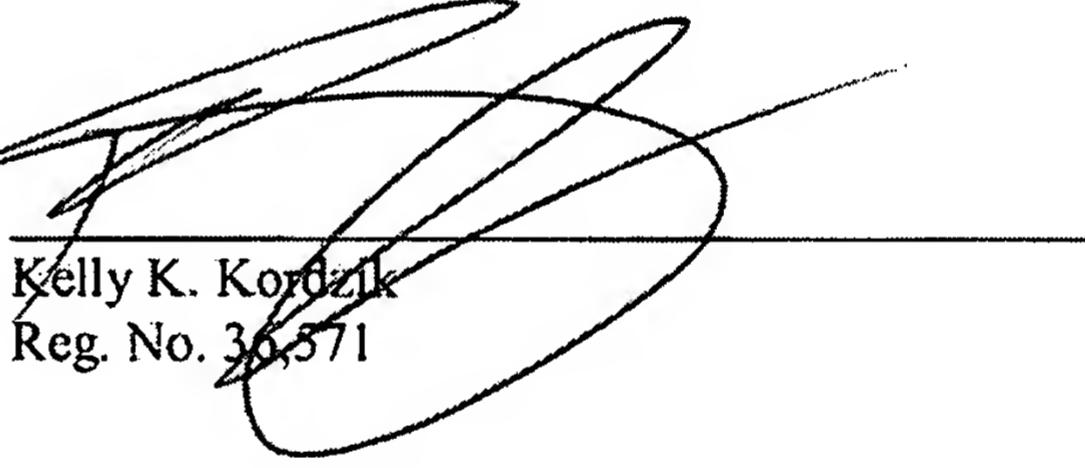
Examiner stated: “[i]t would have been obvious for any person of ordinary skill in the art at the time the invention was made to replace the second marker disclosed by Krutal [sic] or Meyer with the marker disclosed in '283 patent by Anderson, because Anderson demonstrated that these markers are very sensitive and can be used in small amount, which makes the method more efficient.” Final Office Action, at 6. Applicant traverses these rejections.

For the reasons discussed in Section VII.B, in addition to the reasons discussed in Section VII.A, Claims 23-25 are patentable over *Meyer* or *Krutak* in view of *Anderson* '283.

The brief fee of \$510 is enclosed. Please apply any other charges or credits to Deposit Account No. 06-1050.

Respectfully submitted,

Date: Dec. 10, 2007

  
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APPENDIX OF CLAIMS

12. A method for marking a hydrocarbon liquid comprising the steps of:
  - adding a first marker to the hydrocarbon liquid having a molar absorptivity of approximately  $5 \times 10^4 \text{ L mole}^{-1} \text{ cm}^{-1}$  or greater in the wavelength range of about 600-1000 nm; and
    - adding to the hydrocarbon liquid a second marker wherein the second marker is a molecular marker, and wherein a molecular weight of the second marker is artificially enhanced with a non-radioactive isotope.
13. The method of claim 12 wherein the liquid is a petroleum product.
14. The method of claim 12 wherein the desired concentration of the first marker is between 1 ppb and 10 ppb.
15. The method of claim 12 wherein the first marker contains a compound selected from the group consisting essentially of metal containing and metal free phthalocyanine, metal containing and metal free naphthalocyanine, squarilium, croconic acid, indole and substituted indole cyanine and carbocyanine, thiazole type cyanine and carbocyanine, oxazole type cyanine and carbocyanine, metal dithiolene complexes, and indoaniline metal complexes.
17. The method of claim 12 wherein the second marker is a polynuclear aromatic hydrocarbon.
18. The method of claim 12 wherein the second marker is a halogenated hydrocarbon.

19. The method of claim 12 wherein the second marker is selected from the group consisting essentially of 1,2-diphenylbenzene, 1,4-diphenylbenzene, triphenylmethane, 1,3,5-triphenylbenzene, 1,1,2-triphenylethylene, tetraphenylethylene, 1,2,3,4-tetrahydrocarbazole, 1,3-diphenylacetone, 2-chlorobenzophenone, 4,4'-dichlorobenzophenone; 4-benzoylphenone; 4-bromobenzophenone, 4-methoxybenzophenone, 4-methylbenzophenone, 9-fluorenone, 1-phenylnaphthalene, 3,3'dimethoxybiphenyl, and 9-phenylanthracene.

21. The method of claim 12 wherein the molecular weight is enhanced by the addition of a deuterium atom.

22. The method of claim 12 wherein the second marker is selected from the group consisting essentially of acetone, acetonitrile, benzene, bromobenzene, chlorobenzene, chloroform, cyclohexane, dichlorobenzene, trichloroethylene, diethylether, diglyme, dimethylsulfoxide, dioxane, ethanol, methanol, methylene chloride, nitrobenzene, octane, pyridine, tetrachloroethane, tetrahydrofuran, tetramethylsilane, toluene, trifluoroacetic acid, trifluoroethyl alcohol, xylene, ammonium bromide, and acetyl chloride.

23. A method for marking a hydrocarbon liquid comprising the steps of:  
    adding a first marker to the hydrocarbon liquid having a molar absorptivity of approximately 5 times  $10^4$  L mole<sup>-1</sup> cm<sup>-1</sup> or greater in the wavelength range of about 600-1000 wherein the first marker contains a compound selected from the group consisting essentially of metal containing and metal free phthalocyanine, metal containing and metal free naphthalocyanine, squarilium, croconic acid, indole and substituted indole cyanine and carbocyanine, thiazole type cyanine and carbocyanine, oxazole type cyanine and carbocyanine,

metal dithiolene complexes, and indoaniline metal complexes; and

adding a second marker to the hydrocarbon liquid wherein the second marker is selected from the group consisting essentially of 1,2-diphenylbenzene, 1,4-diphenylbenzene, triphenylmethane, 1,3,5-triphenylbenzene, 1,1,2-triphenylethylene, tetraphenylethylene, 1,2,3,4-tetrahydrocarbazole, 1,3-diphenylacetone, 2-chlorobenzophenone, 4,4'-dichlorobenzophenone; 4-benzoylphenone; 4-bromobenzophenone, 4-methoxybenzophenone, 4-methylbenzophenone, 9-fluorenone, 1-phenylnaphthalene, 3,3'dimethoxybiphenyl, and 9-phenylanthracene.

24. The method of claim 23 wherein the liquid is a petroleum product.

25. The method of claim 23 wherein the desired concentration of the first marker is between 1 ppb and 10 ppm.

51. A liquid marker compound comprising:

a first marker having a molar absorptivity of approximately  $5 \times 10^4 \text{ L mole}^{-1} \text{ cm}^{-1}$  or greater in the wavelength range of about 600 to 1000 nm; and

a second marker wherein the second marker is a molecular marker, and wherein a molecular weight of the second marker is artificially enhanced with a non-radioactive isotope.

52. A liquid marker of claim 51 wherein a desired concentration of the first marker is between 1 ppb and 10 ppm.

53. The liquid marker of claim 51 wherein the first marker produces a characteristic peak at a known wavelength.

54. The liquid marker of claim 51 wherein the first marker contains a compound selected from the group consisting essentially of metal containing and metal free phthalocyanine, metal containing and metal free naphthalocyanine, squarilium, croconic acid, indole and substituted indole cyanine and carbocyanine, thiazole type cyanine and carbocyanine, oxazole type cyanine and carbocyanine, metal dithiolene complexes, and indoaniline metal complexes.

55. A liquid marker of claim 51 wherein the second marker is a polynuclear aromatic hydrocarbon.

56. The liquid marker of claim 51 wherein the second marker is a halogenated hydrocarbon.

57. The liquid marker of claim 51 wherein the second marker is selected from the group consisting essentially of 1,2-diphenylbenzene, 1,4-diphenylbenzene, triphenylmethane, 1,3,5-triphenylbenzene, 1,1,2-triphenylethylene, tetraphenylethylene, 1,2,3,4-tetrahydrocarbazole-, 1,3-diphenylacetone, 2-chlorobenzophenone, 4,4'-dichlorobenzophenone; 4-benzoylphenone; 4-bromobenzophenone, 4-methoxybenzophenone, 4-methylbenzophenone, 9-fluorenone, 1-phenylnaphthalene, 3,3'dimethoxybiphenyl, and 9-phenylanthracene.

59. The liquid marker of claim 58 wherein the molecular weight is enhanced by the addition

of a deuterium atom.

60. The liquid marker of claim 51 wherein the second marker is selected from the group consisting essentially of acetone, acetonitrile, benzene, bromobenzene, chlorobenzene, chloroform, cyclohexane, dichlorobenzene, trichloroethylene, diethylether, diglyme, dimethylsulfoxide, dioxane, ethanol, methanol, methylene chloride, nitrobenzene, octane, pyridine, tetrachloroethane, tetrahydrofuran, tetrametholsilane, toluene, trifluoroacetic acid, trifluoroethyl alcohol, xylene, ammonium bromide, and acetyl chloride.

61. A liquid marker compound comprising:

a first marker having a molar absorptivity of approximately  $5 \times 10^4 \text{ L mole}^{-1} \text{ cm}^{-1}$  or greater in the wavelength range of about 600 to 1000 nm, wherein the presence of the first molecular marker can be determined by a handheld IR spectrometer; and

a second marker wherein the second marker is a molecular marker, wherein a molecular weight of the second marker is artificially enhanced with a non-radioactive isotope.

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EVIDENCE APPENDIX

No evidence was submitted pursuant to §§1.130, 1.131, or 1.132 of 37 C.F.R. or of any other evidence entered by the Examiner and relied upon by Appellants in the Appeal.

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RELATED PROCEEDINGS APPENDIX

None.